Before the
FEDERAL COMMUNICAIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
Inquiry Regarding Carrier Current	)	
Systems, including Broadband over	)	ET Docket No. 03-104
Power Line Systems	)	

REPLY COMMENTS OF
GARY W. BOX
To Comments of
SOUTHERN LINC,
SOUTHERS TELECOM, INC., AND
SOUTHERN COMPANY SERVICES. INC
Dated 7 July 2003

These are Reply Comments of Gary W. Box to comments filed by Southern LINC, Southern Telecom Inc, and Southern Company Services, in this document referred to as "Southern".

The writer received a BSEE and MSEE from UCLA, 1977 and has been employed as a electrical engineer involved in the power electronics and industrial electronics industries for 29 years, mainly in product development. This experience includes numerous encounters with FCC emission requirements including designing, building and testing equipment for EMI compliance. The writer has also been issued 9 patents and currently holds the call sign N0JCG as a member of the Amateur Radio Service.

These replies take the form of excerpts from Southern's original comment, noted as "Comment," followed by reply remarks, noted as "Reply". Each Comment and Reply is annotated by a number. Replies commence immediately below.

1. COMMENT:
"Southern believes that commercial deployment of BPL will be primarily located in the 1.705 to 50MHZ band."

REPLY
Of the entire electromagnetic spectrum, from DC to light, only the tiny sliver between 1 and 30 MHz is capable of unassisted, worldwide communication using little power and absolutely no infrastructure. The Amateur Radio Service, short-wave broadcast and other services demonstrate this fact daily. When the FCC was established, it was to bring order to the radio spectrum. It has done so by establishing a licensing structure and making rules to protect those services from interference. Unlicensed operation can never be allowed to have priority or even equal footing with licensed services unless they themselves become licensed, which includes a means to identify the source of the transmission. To do otherwise would be to return to the chaos of the spark transmitter.

2. COMMENT:
"Conducted emission limits are intended to prevent RF energy from devices connected to AC power lines from being carried along those lines to other devices connected to the same AC power lines. Conducted emission limits are also intended to limit the potential for AC power lines to act as antennas for long

wavelength frequencies (i.e. those below 30 MHz) and interfering with devices located some distance from the lines due to the low propagation loss of frequencies in this range."

REPLY
In this statement Southern concedes that the AC power lines act as antennas for wavelengths below 30 MHz, the very frequency range they want to use for BPL! They further concede that RF energy in this frequency range will interfere with devices located some distance from the lines. However, Southern then goes on to advocate that BPL signals, which are intentionally injected onto the power line, can be at a higher conducted level. RF energy on the power line will behave the same regardless of what the source of the energy was. How can Southern concede that RF energy from noise sources can cause interference and insist that higher levels of RF energy in the same frequency band from BPL operation won't cause interference? This defies not only physics, but also logic.

3. COMMENT:
"BPL components used outside the home and intended to be installed on or in close proximity to medium voltage power lines should be considered Class A digital devices and subject to the higher limits for such devices."

REPLY
With this, and other comments, Southern makes it clear that they are seeking to have the Commission impose the highest possible RF radiation limits on BPL technology. They are thus admitting that the power line is a poor conductor of RF and they need to increase the radiated energy level as high as possible to get sufficient conductive performance. The conducted limits were set after significant study by the FCC. The power distribution system will react the same to RF energy whether it is from noise or intentional BPL injection. Experience has shown that the power lines and related hardware are capable of resonance, RF gain and mixing, which are some of the reasons the limits were imposed in 1989. By raising the conducted limits the commission would be throwing out almost 20 years of progress in suppressing unintentional HF RF emissions.

4. COMMENT:
"It is unnecessary, however, to define frequency bands to be avoided by Access BPL or to make other modifications to Part 15 in order to further protect licensed services. Southern is not aware of any reported cases of harmful interference for the use of this technology."

REPLY:
Southern is apparently not aware of the tests done in Japan, Germany, Austria, England and, most recently, here in the US, all of which show substantial harmful interference from BPL transmissions. Southern has also chosen to take the attitude of "pollute first and see who notices". It is quite easy to conduct tests on how BPL will affect amateur radio, short-wave and other HF radio reception, but they chose instead to proceed with transmissions and wait for interference reports. It should be pointed out that the BPL tests to date in the United States have been over a controlled and very limited geographical area with no parties interested in HF communications invited to participate. The commission should rely on testing with actual receiving and transmitting equipment to determine harmful interference and not rely on interference incident reports.

5. COMMENT:
"A number of radio amateurs have commented that interference from electric power lines is difficult to identify and correct, and they suggest Access BPL will be of the same type. These concerns are unfounded, however, because there are a multitude of locations on a normally functioning electric power system where RF noise can be detected by sensitive amateur radio receivers. By contrast, Access BPL will involve identifiable RF devices on discrete power lines and operating on specific radio frequencies or bands of frequencies."

REPLY

I agree that interference from electric power lines is difficult to locate. However, it is not difficult to determine that the power line is at fault. I further agree that BPL signals will be very distinctive. It will be like listening to a modem on a telephone line. In this statement Southern also acknowledges that sensitive amateur radio receivers will pick up RF noise from the power line, which by law is interpreted as harmful interference and the utility is required to correct. They then state that Access BPL will be identifiable with the same receivers thus acknowledging the existence of harmful interference.

6. COMMENT
"Access BPL can provide more efficient operation of electric power systems and improved reliability for consumers. This broadband platform also offers the potential for greater access to broadband services, improvements in the competitiveness of the broadband services marketplace, and the potential for new products and services that would benefit from a broadband connection at any electric outlet."

REPLY
Access BPL is not the only way the utilities can achieve these goals. In fact it is not the most economical, easiest deployed, or reliable of the choices available to the utility. I would like to remind the Commission of their recent work on establishing the Unlicensed National Information Infrastructure band at 5Ghz. The very function of Access BPL is to be part of this infrastructure. It seems only logical that the utilities also use the U-NII band for this purpose. By mounting U-NII nodes on power poles at appropriate intervals (between 1 and 10 miles), All the goals of the Commission, the utilities and even the manufacturers can be achieved without causing interference to any HF users. Perhaps more importantly, U-NII implementations such as the Motorola Canopy system can be deployed immediately, without any further Commission action or cost to the Federal Government.

The advantages of using the U-NII band over BPL are numerous:

1. No interference to any users in HF.
2. No need for frequency notches.
3. No direct connection to power line, other than for power.
4. Independent of powerline noise.
5. Independent of powerline impedance characteristics.
6. Independent of power grid switching
7. Independent of powerline reliability, with battery backup.
8. Independent of powerline routing. Only pole location is important.
9. Freedom to configure the network as desired; either with directional antennas or omnis.
10. No safety concerns.
11. No interference liability for the utility.
12. Cheaper hardware (5Ghz transverter should be cheaper than powerline inductive components).
13. Lower radiated RF power
14. Lower power consumption overall. Could be solar powered
15. System robustness
16. FCC gets its "third wire".
17. Providing rural service is trivial.
18. Strap-on installation means neighborhoods could be "wired" in hours, not months.
19. Cheaper installation
20. Little or no rule changes needed.
21. Bandwidth is almost four times wider than BPL, leading to higher performance.

7. COMMENT:
"However, to make the investment to bring this technology to the market, utilities must have some regulatory certainty on the technical and operational requirements for these systems. Southern therefore urges the Commission to confirm the status of Access BPL under Part 15 and to clarify the measurement procedures for assessing compliance of Access BPL with the relevant Part 15 limits."

REPLY:

I couldn't agree more with Southern on the need for regulatory certainty on the technical and operational requirements for these systems. However, I urge the Commission to declare these system what they are, part of the Unlicensed National Information Infrastructure. As such, they should be subject to the same rules such as operation in the 5GHz band, power levels up to 1 watt, etc. All of which are already in place. BPL operation in the HF bands has been rendered obsolete by the establishment of the U-NII band and should not be allowed to proceed.

BPL is the first application that I know of that has proposed unlicensed operation over the entire HF band. Part 15 devices now operating in the 2 to 80MHz range are either narrow band or infrequent emitters. Interference from these devices usually does not constitute harmful interference and can be tolerated. When it does, the regular Part 15 remedies are used to resolve the problem successfully. BPL will be a constant emitter, thus any interference with a licensed service would constitute harmful interference. The Part 15 remedies, of moving or turning off the offending device will be strongly opposed by the BPL providers and manufacturers. The commission has established rules on conducted HF emissions to prevent HF emissions from RF noise sources on power lines. I submit that all carrier current systems operating in the HF region should be subject to at least the same limits.